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(54) Title: LONG WAVELENGTH LONG LIFETIME LUMINOPHORES

(57) Abstract: A new approach is described to making luminophores which display long emission wavelengths, long decay times, and high quantum yields. These luminophores are covalently linked or otherwise closely associated pairs with a long lifetime resonance energy transfer (RET) donor e.g., a ruthenium (Ru) metal-ligand complex, and a long wavelength acceptor, e.g., Texas Red. The donor and acceptor can be covalently linked by, e.g., poly-proline spacers. The long lifetime donor results in a long lived component in the acceptor decay which is due to RET. The quantum yield of the luminophores approaches that of the higher quantum yield acceptor, rather than the lower quantum yield typical of metal-ligand complexes. The emission maxima and decay time of such tandem luminophores can be readily adjusted by selection of the donor, acceptor and distance between them. Luminophores with these useful spectral properties can also be donor-acceptor pairs brought into close proximity by some biochemical association reaction. Luminophores with long wavelength emission and long lifetimes have numerous applications in biophysics, clinical diagnostics, DNA analysis and drug discovery.

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